FlyBy Math™ Alignment
Mathematics Grade Level Expectations
March 20, 2006 v.5

Strand: Number, and Operations

Grade-Level Expectations	***FlyBy Math*™ Activities**
M(N&O)–8–4 **Accurately solves problems involving** proportional reasoning; (percent increase or decrease, interest rates, markups, or rates); multiplication or division of integers; and squares, cubes, and taking square or cube roots.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
M(N&O)–8–7 **Makes estimates** in a given situation (including tips, discounts, tax and the value of a non-perfect square root as between two whole numbers) by identifying when estimation is appropriate, selecting the appropriate method of estimation, determining the level of accuracy needed given the situation, analyzing the effect of the estimation method on the accuracy of results, and evaluating the reasonableness of solutions appropriate to grade level GLEs across content strands.	--Predict outcomes and explain results of mathematical models and experiments.

Strand: Functions and Algebra

Grade-Level Expectations	***FlyBy Math*™ Activities**
M(F&A)- 8–1 **Identifies and extends to specific cases a variety of patterns** (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; **and generalizes** a linear relationship (non-recursive explicit equation); generalizes a linear relationship to find a specific case; **generalizes** a nonlinear relationship using words or symbols; or **generalizes** a common nonlinear relationship to find a specific case.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
M(F&A)-8–2 **Demonstrates conceptual understanding of linear relationships** ($y = kx$; $y = mx + b$) **as a constant rate of change** by solving problems involving the relationship between slope and rate of change; informally and formally determining slopes and intercepts represented in graphs, tables, or problem situations; or describing the meaning of slope	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system. --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.

and intercept in context; **and distinguishes between linear relationships (constant rates of change**) **and nonlinear relationships (varying rates of change)** represented in tables, graphs, equations, or problem situations; or **describes how change in the value of one variable relates to change in the value of a second variable** in problem situations with constant and varying rates of change.	--Interpret the slope of a line in the context of a distance-rate-time problem.
M(F&A)–8–4 **Demonstrates conceptual understanding of equality** by showing equivalence between two expressions (expressions consistent with the parameters of the left- and right-hand sides of the equations being solved at this grade level) using models or different representations of the expressions, solving formulas for a variable requiring one transformation (e.g., $d = rt$; $d/r = t$); by solving multi-step linear equations with integer coefficients; by showing that two expressions are or are not equivalent by applying commutative, associative, or distributive properties, order of operations, or substitution; and by informally solving problems involving systems of linear equations in a context.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Use the distance-rate-time formula to predict and analyze aircraft conflicts. --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.

Strand: Data, Statistics, and Probability

Grade-Level Expectations	***FlyBy Math*™ Activities**
M(DSP)–8–6 **In response to a teacher - or student-generated question or hypothesis**, decides the most effective method (e.g. survey, observation, experimentation) to collect the data (numerical or categorical) necessary to answer the question; collects, organizes and appropriately displays the data; analyzes the data to draw conclusions about the questions or hypothesis being tested, while considering the limitations that could affect interpretations; and when appropriate makes predictions, asks new questions, or makes connections to real-world situations. (IMPORTANT: *Analyzes data consistent with concepts and skills in* M(DSP)–8–2)	--Conduct simulation and measurement for several aircraft conflict problems. --Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs. --Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions.

Strand: Problem Solving, Reasoning, and Proof

Grade-Level Expectations 6-8	*FlyBy Math*™ Activities
M(PRP)–8–1 **Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content** and be able to: • Use problem-solving strategies appropriately and effectively for a given situation. • Determine, collect and organize the relevant information needed to solve real-world problems. • Apply integrated problem-solving strategies to solve problems in the physical, natural and social sciences, and in pure mathematics. • Use technology when appropriate to solve problems. • Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

Strand: Communication, Connections, and Representations

Grade-Level Expectations 6-8	*FlyBy Math*™ Activities
M(CCR)–8–1 **Students will communicate their understanding of mathematics** and be able to: • Articulate ideas clearly and logically in both written and oral form. • Present, share, explain, and justify thinking with others and build upon the ideas of others to solve problems. • Use mathematical symbols and notation. • Formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.	--Predict outcomes and explain results of mathematical models and experiments. --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
Grade-Level Expectations 6-8	***FlyBy Math*™ Activities**
M(CCR)–8–2 **Students will create and use representations to communicate mathematical ideas and to solve problems** and be able to: • Use models and technology to develop equivalent representations of the same mathematical concept. • Use and create representations to solve problems and organize their thoughts and ideas. • Convert between representations (e.g., a table of values, an equation, and a graph may all be representations of the same function).	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.